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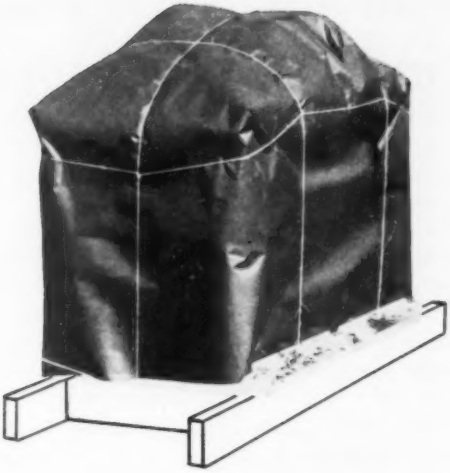

Wintering Honeybees in New York State

BY E. J. DYCE AND R. A. MORSE

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Each year thousands of colonies of honeybees are needlessly lost or seriously weakened because of faulty wintering. It is not costly or time consuming to winter bees successfully, yet poor wintering usually represents the greatest single financial loss to beekeepers. Not only is it important to give colonies in this State some winter protection, but it is equally important to winter only good colonies.

Because honeybees are unable to migrate to warmer climates or to hibernate as do some animals and solitary insects, it is necessary for them to store enough honey to keep alive during winter. When the temperature drops to about 57° F., the bees form a cluster within the hive. If the temperature continues to fall, the bees generate heat within the cluster, mainly by muscular activity, to keep themselves warm. This requires a considerable amount of good quality honey. For this reason only strong, populous colonies comprised largely of young bees that have been supplied with an abundance of good stores should be wintered.

There are three major requirements for good wintering: young bees, good food, and protection.

BEES

A good colony not only needs bees capable of surviving the winter, but sufficient bees to start brood rearing in the spring. Spring dwindling is often reported, and is the result of overwintering too many old bees that die more rapidly than they can be replaced in the spring. This problem may be aggravated if the bees are not provided with enough good food and protection. To have an abundance of young bees in the fall, all colonies should be headed by young vigorous queens capable of laying late in the fall. It is advisable to requeen all colonies with failing queens during the latter part of July or early August.

FOOD

Enough honey should be left on each hive in the fall to winter the bees and to make spring feeding unnecessary. Roads are often in poor condition in the spring, and inclement weather frequently makes spring feeding difficult. A two-story hive properly provisioned with honey for winter and spring should weight about 130 pounds and contain at least 60 pounds of honey.

Colonies with a reserve supply of pollen build up faster in the spring than do those low in pollen. In most areas of New York State there usually is sufficient pollen available in the spring to make feeding of pollen substitutes or supplements unnecessary.

High quality clover and buckwheat honey provide excellent food on which to winter bees. These honeys contain a minimum amount of indigestible material. Because bees normally do not void their fecal matter in the hive, it is important to supply them with winter food that has the least amount of indigestible material. If an excess amount of waste material accumulates in the bees' intestines, a condition known as dysentery develops.. Little or no trouble will be experienced from dysentery if the bees are supplied with good food, even if they are unable to fly for a period of six or more weeks during winter.

Honey-dew honeys and most honeys from tree sources are usually high in indigestible materials and should not be used for winter stores. Aster honey crystallizes rapidly and often becomes so hard that the bees are unable to use it. Goldenrod honey is not so satisfactory as clover honey, but may be used for winter stores. All honeys, as well as sugar syrup, should be well ripened and contain no more than 18 percent moisture before cold weather commences in the fall. For this reason, feeding should be completed early enough in the fall to give the bees ample time to remove excess moisture from their stores.

When stores are of poor quality, winter loss will be reduced by feeding each colony one or more ten-pound pails of sugar syrup. Sugar syrup contains practically no indigestible material and is the best substitute for good honey. When fed to bees in the fall, it is usually stored in the center of the brood nest and consumed first. This helps to delay the accumulation of fecal matter and to prevent dysentery. To prepare sugar syrup for feeding in the fall, mix one part of cane or beet sugar by weight or meaure with one part of water. Hot water should be used because it is difficult to get two parts of sugar to dissolve in one part of cold water. Stirring by hand is effective, but a washing machine will prepare the syrup quickly and thoroughly.

The location of the honey in the hive is important. During winter the cluster of bees gradually moves in an upward direction. Therefore most of the honey should be in the second hive body. Honeybees usually arrange their food above and around their clusters during September and October. For this reason, combs should not be moved or exchanged in hives after the latter part of September.

Figure 1. The feeder pail.

Feeders

There are several types of feeders, but the ten-pound honey pail is most common and most desirable because it permits the colony to receive sufficient food at one time. With a three-penny nail, punch about 20 small holes in the friction top lid. The number of holes in the lid controls the rate of feeding.

The feeder pail is inverted over the bee-escape hole in the inner cover (figure 1), or is placed on the top bars of the combs directly over the cluster of bees. The feeder pail should be reasonably level to prevent the syrup from leaking out. An empty hive body is then set over the feeder and the lid of the hive replaced.

Division board feeders (figure 2) may be purchased or homemade. To prevent leakage, the feeders should be heavily nailed and coated with wax or paraffin both inside and outside before they are used. Some beekeepers leave the feeders in the hive the year around, and in this case the bees usually keep them leakproof. The feeder should be large enough to hold six to ten pounds of sugar syrup.

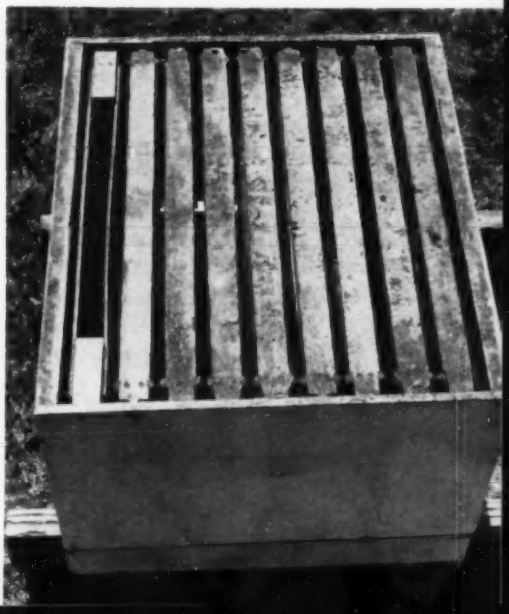

Figure 2. Masonite has been used for the two side pieces of this division board feeder.

PROTECTION

Apiary locations

Good apiary locations are open to sunlight, dry, reasonably level, and well protected from the prevailing winds, but such locations are difficult to find. An abundance of sunlight during the winter months helps to keep the colony dry, permits more frequent cleansing flights, and gives the bees more opportunities to move their cluster to new stores.

Colonies that face south and are well protected from the prevailing winds will survive the winter with less mortality. Furthermore, the bees use smaller amounts of honey and have more vitality left for spring work. If the apiary is not well protected, a temporary windbreak or fence should be erected and used until a hedge is planted and has grown sufficiently to provide protection. A hedge consisting of three or four rows of evergreen trees, spaced to permit some circulation of air, is ideal. A temporary windbreak is usually made about seven-feet high with boards spaced about two-inches apart. Such a fence or hedge breaks the force of the wind and tends to lay a blanket of snow over the apiary, which helps to keep the colonies warm. Colonies should not be located near solid walls or buildings. Such structures frequently cause wind currents that do more harm than good.

Colonies occasionally will attempt flights on bright days during winter when the weather is too cold. Many bees that are unable to fly back to their hives will be found on the snow. Bees are cold-blooded and are no longer able to fly when they encounter low temperatures. The loss of these bees during winter is usually not serious, and may actually benefit the colony. It is usually the older bees and those with the greatest accumulation of fecal matter that leave the hive and are lost. Large flights of this nature are more likely to occur in locations that are too well protected and do not have enough air drainage. Sometimes the temperature in these small protected areas or nooks may be 10° or 15° F. higher than the surrounding air. In such locations, a few low trees should be removed to permit more circulation of air.

Humidity and its control

Bees are capable of withstanding extremely low temperatures, but moisture accumulation within the hive can be disastrous. Far more colonies die each year from high humidity and moisture accumulation than from cold temperatures. One of the main factors in successful wintering is the proper control of moisture within the hive. An apiary that has good air and water drainage will experience little trouble from moisture.

The honey consumed by bees is broken down into carbon dioxide and water. For every gallon of honey consumed, an almost equal volume of moisture is given off in the hive. Unless adequate provision is made for the escape of this

Figure 3. This inner cover has both a bee-escape hole and a hole in front to allow two or three bees to fly from the hive at the same time. The inner cover is usually inverted for summer use.

moisture, colony mortality may be high. When clustered, bees are unable to ventilate their hives by fanning. Therefore moisture must be removed by convection currents, or it will condense in the hive. *Any colony that has moldy comb and an accumulation of excess moisture on the bottom board, lid, or combs in the spring has not been properly packed for winter.* It is well to watch for these conditions in the spring and to take proper precautions the following year.

Colonies that are not packed or wrapped for winter should be given some type of upper entrance. Winter losses will be heavy if this precaution is not taken. The best place to provide an upper entrance is in the inner cover (figure 3). Make a small opening, large enough to permit the escape of two or three bees at a time, in the rim of the inner cover. Pull the telescope lid forward on the hive and hold it in this position with a small block of wood to provide a roof and an outlet for the bees using the upper entrance. Each colony, whether it is packed or not, should be provided with a bottom board entrance about 2½ inches long by about ⅜ inches deep. Without a bottom entrance and some method to permit the escape of moisture from the top of the hive, most colonies will soon become too damp.

It is not necessary to provide special top entrances in colonies that are properly packed for winter. If a hole is not present in the inner cover, a small piece of wood or a nail slipped under one edge of the inner cover will permit the moisture to escape from the colony into the packing above.

In the College apiaries both 20-inch and 22-inch bottom boards are used, and both have proven satisfactory. The 22-inch bottom board has a two-inch projection or porch in front, but this causes no problem in packing the bees for winter or from collecting ice and plugging the entrance.

Packing materials and methods

Experiments conducted in many of the northern states and in provinces of Canada show that packaging or wrapping colonies for the winter is desirable. In New York State, colony packing is just as important as a good windbreak.

Because competition is keen in commercial honey production, each expense in operating colonies must be carefully analyzed and justified. In the past, heavy wooden packing cases (figure 4) were used widely with considerable success. The cost of constructing these cases and the labor involved in packing and unpacking them is now nearly prohibitive. Furthermore, it has been found that colonies heavily packed in wooden cases do not warm up quickly or often enough to allow the necessary mid-winter flights. Some commercial beekeepers who still have good wooden cases are no longer using them; they are convinced the bees winter better in tar paper wraps.

The type of tar paper commonly used for packing bees is cheap and easy to handle. Heavy tar paper that forms a vapor barrier or seal should not be used because moisture will condense on the inside of the wrap and keep the insulation wet.

The chief advantage of tar paper is its dark color. It absorbs the heat rays of the sun and frequently warms the colonies during the winter months. Warmth helps to keep the colonies dry, permits their clusters to move upwards to new stores, and provides more opportunities for cleansing flights. For these reasons, the use of tar paper for wrapping colonies has increased greatly.

Various methods of packing colonies for winter have been studied. Wrapping two colonies together on a hive stand with some insulation, mainly on top of the colonies, has been the most efficient and economical method. It has been used in the College apiaries and by many commercial beekeepers in this State with excellent results for 15 years. A step by step description of this packing method is shown on pages 10 to 15. Following this procedure, one man can pack between 50 and 75 colonies in an eight-hour day.

Figure 4. This quadruple packing case has been used successfully in central New York State for several years. Such cases are satisfactory, but their cost is now prohibitive.

The hive stand

Protection from moisture and the elimination of cold drafts on the bottom of the hives are important. The two colony hive stand (figure 5) is constructed to permit bottom packing. If no packing is used, the stand at least stops drafts and provides a dead air space under the two colonies.

The hive stand shown in figure 5 is made of two-inch by six-inch material that has been treated with pentachloraphenol. Pentachloraphenol will protect hive stands of this sort from decay for 15 to 20 years. Creosote is also an excellent wood preservative.

The hive stand is constructed to create a dead air space under the hives when two bottom boards are placed together over the center area. The two short cross-members are $32\frac{1}{2}$ inches apart (outside dimensions). The outside width of the hive stand is 20 inches and the length about 48 inches. The ends of the hive stand project eight inches beyond the short cross-members, although this dimension may be longer. The object is to have sufficient space between the colonies to work them effectively when they are moved apart during the summer.

In addition to being valuable for winter and convenient for summer work, this hive stand protects bottom boards and other hive parts from moisture and prolongs their life.

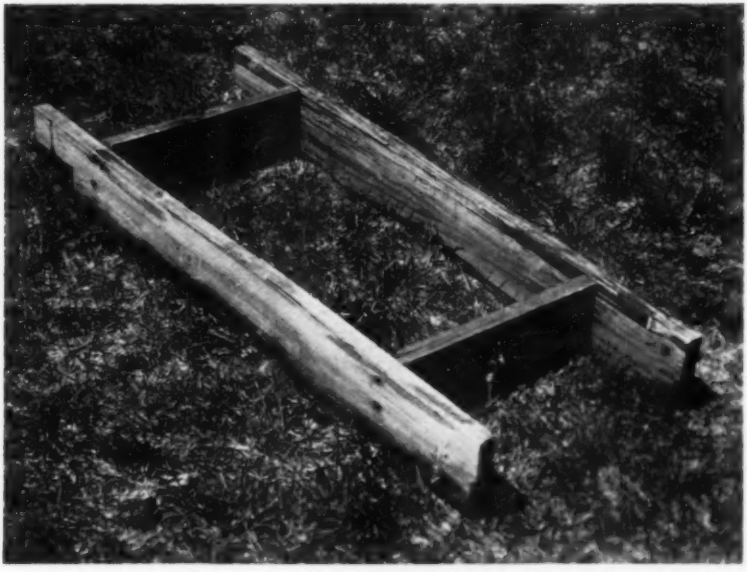

Figure 5. A two colony hive stand.

Packing procedure

After hives are placed on stands, the next step in preparing them for winter is to remove the covers (figure 6). Make sure there is either a top entrance for the bees or that an opening is present in the inner cover to permit moisture to escape into the packing material.

The next step is to push the two colonies together so they fit over the dead air space created by the hive stand (figure 7). Placing packing material in the dead air space under the colonies is optional.

The wrapping paper should be cut to length before it is taken to the apiary location. One long piece (about 11 feet) is placed around the colonies (figure 8) and two nails are used to pin the paper together in the back. The position of one of the nails is shown in figure 9.

Place entrance cleats (figure 10) in front of the colonies, using one nail to hold each cleat in place. The nails protrude about one inch and are used to tie the string that holds the lid in place and to give support to the pack.

A narrow cleat about 30 inches long, with two nails protruding, is used to hold the tar paper in place on the back of the colonies. Side cleats are optional and probably are not necessary when a hive stand is used. Projecting nails are driven in the cross-members at the end of each hive stand to tie the string that holds the tar paper in place.

About a teaspoonful of poison should be placed on top of one of the inner covers for mouse control. A successful formula for mixing mouse poison is given on page 16.

Before the tar paper lid is put in place, insulating material should be placed on top of the colonies. Many types of material have been advocated, but wheat straw is one of the cheapest and easiest to use. The straw should be loosely packed, but pulled together in the center of the colonies to form a dome-shaped support for the top of the lid from which water will drain readily.

The next step is to pin down the four corners of the pack, again using nails as shown in figure 11. There should be sufficient straw in the pack to protrude slightly from the top and assist in the escape of moisture.

A short piece of tar paper (about 4½ feet long) is then placed over the colonies to act as a lid (figure 12).

Heavy binder twine is used to tie the final pack in place (figure 13). A loop is made at one end of the string that is brought over the top of the pack and fastened to the nails in each end of the hive stand. The twine is then tied from front to back of each colony as shown in figure 14.

The last step in tying is to wrap one string all the way around the top of the pack to hold the tar paper lid securely in place (figure 15).

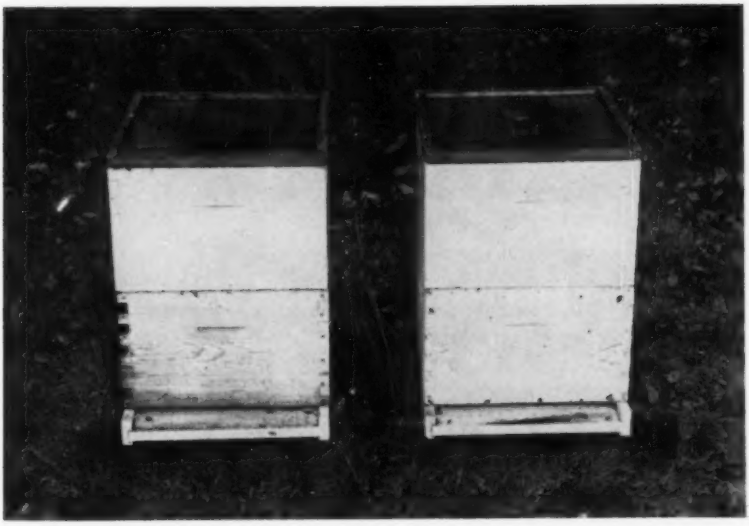

Figure 6. Colonies with covers removed for packing.

Figure 7. These colonies with 20-inch bottom boards have no projection in front. They have been moved together before wrapping.

Figure 8. The long wrapping paper in place.

Figure 9. A nail is used to pin the wrapping paper in place.

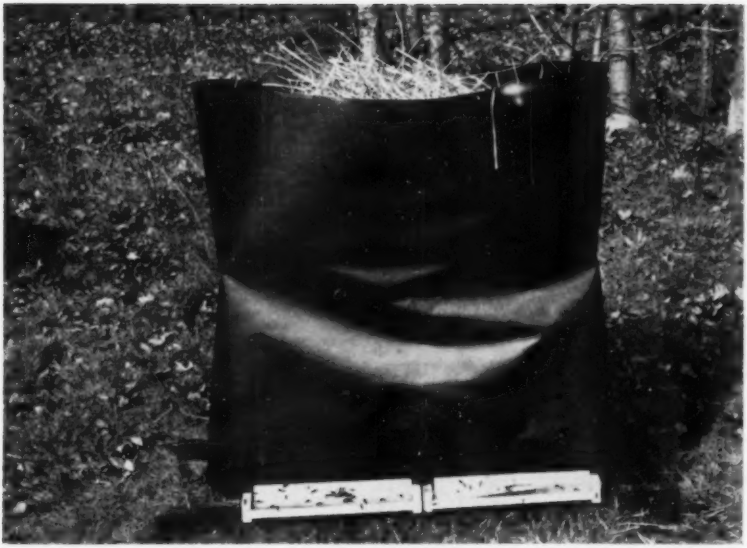

Figure 10. Entrance cleats hold the paper on the bottom front of the colonies. Loosely packed straw is placed on top for insulation.

Figure 11. The four corners of the wrapping paper are pinned with nails.

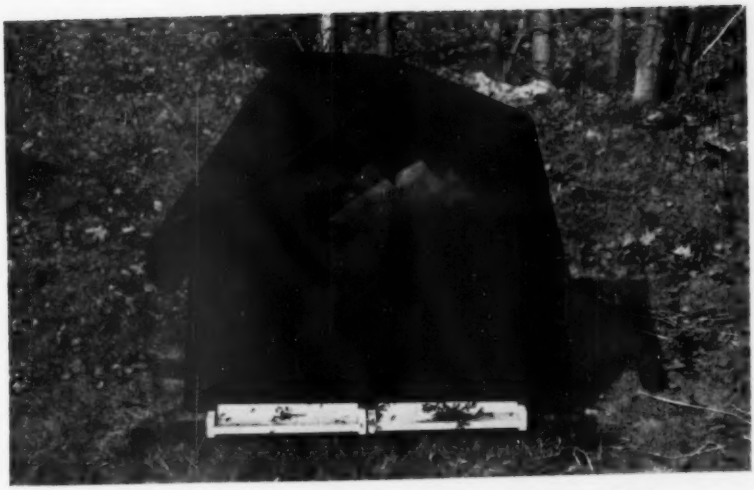

Figure 12. A tar paper lid is placed over the colonies.

Figure 13. The first string is placed over the lid.

Figure 14. Twine is placed front to back over both colonies.

Figure 15. One piece of twine is placed around the pack.

Figure 16. The final pack and tie.

Figure 17. Sequence of steps in packing, shown from right to left.

Mouse damage and its prevention

Mice frequently attempt to enter hives in the winter and can cause considerable damage if not killed. Mouse poisons may be purchased or homemade. A satisfactory formula is as follows:

Mix one level tablespoon of laundry starch in ¼ teacup of cold water. Stir this into ¾ of a pint of boiling water to make a clear paste. Mix one ounce of strychnine sulphate (not strychnine alkaloid) with one ounce of baking soda and stir this into the hot starch paste to make a smooth cream free from lumps. Then stir in ¼ pint of honey or heavy corn syrup and one tablespoon of glycerine or liquid petrolatum.

When this has been well mixed, pour it over 12 pounds of wheat and mix thoroughly to coat each grain evenly. Rolled oats are considered to be more attractive to mice than wheat, but a number of persons have reported difficulty in getting an even mixture with it. If rolled oats are used, add the poison mixture to eight quarts of rolled oats from which the fine particles have been screened and then mix very thoroughly with a putty knife or a hand chopper until all lumps are broken up and the mixture is of a fairly even texture.

Place the treated grain in a warm, dry location, such as above a furnace, and stir it daily for two or three days, or until it becomes thoroughly dry. The grains should not cling together when dry. The thin coat of poison covering each grain is barely noticeable. The poisoned grain may be stored for several months in a closed container. The usual precautions in handling poison should be carefully observed.

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